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Indian Standard

SERIES 1 FREIGHT CONTAINERS — INTERFACE CONNECTIONS FOR TANK CONTAINERS

UDC 621·869·888

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 1993 **Group Price 2**

Freight Containers Sectional Committee, HMD 12

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 9669 : 1990 'Series 1 Freight containers— Interface connections for tank containers', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Freight Containers Sectional Committee (HMD 12) and approval of the Heavy Mechanical Engineering Division Council.

The text of ISO standard has been approved for publication as Indian Standard without deviations. Certain terminology and conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 1496-3 : 1981	IS 13288 (Part 3) : 1992 Series 1 Freight container — Specification and testing : Part 3 Tank containers for liquid and gases	Identical

ISO 1496-3 : 1981 is under revision. IS 13288 (Part 3) : 1992 will also be revised after the publication of the corresponding International Standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

AMENDMENT NO. 1 APRIL 2005
TO
IS 13697 : 1993/ISO 9669 : 1990 SERIES 1 FREIGHT CONTAINERS — INTERFACE CONNECTIONS FOR TANK CONTAINERS

After section 2, add the following sections and annex.

Section 3: Man-hole openings and man-hole lids for tank containers of type codes 70 to 76 and 85 to 88

3.1 General

This section specifies certain dimensions and characteristics of man-hole openings and man-hole lids, primarily to ensure that tank containers are equipped with openings of sufficient size to allow complete internal inspection and cleaning, and to provide ease of filling and easy passage of persons in an emergency. In addition, the dimensions and characteristics specified also simplify emergency maintenance and parts replacement by providing compatibility between manufacturing sources.

The dimensions and characteristics specified are applicable to tank containers complying with the requirements of ISO 1496-3, intended to contain liquids or pressurized dry bulk, with a specified test pressure not exceeding 600 kPa[1], i.e. tank containers of type codes 70 to 76 and 85 to 88.

Except where otherwise stated, the requirements of this International Standard are minima. Tank containers to be used for the carriage of dangerous goods may be subject to additional international and national requirements as applied by competent authorities.

3.2 Dimensions and characteristics

3.2.1 General

The dimensions specified in this section relate particularly to the man-hole access opening into the tank. However, the use of the dimensions specified for hinge pins and sealing ring cross-sections should be considered when designing other tank openings closed by lids, for example cleaning apertures above the cargo level.

Care should be taken to ensure stability of the man-hole lid in the open position.

3.2.2 Pressure requirements

Man-hole openings and man-hole lids shall be constructed to a recognized pressure vessel code.

3.2.3 Opening diameter

The internal diameter of the man-hole opening shall be 500 mm ± 1 mm (*A* on figure 2). Maximum out-of-roundness shall not exceed 5 mm.

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[1] 100 kPa = 1 bar

3.2.4 Man-hole lid sealing ring

3.2.4.1 The man-hole lid sealing ring shall be positively retained in the man-hole lid, not in the neckring (see figure 2).

3.2.4.2 The nominal internal diameter of the man-hole lid sealing ring shall be 490 mm (*B* on figure 2).

3.2.4.3 The nominal cross-section of the man-hole lid sealing ring shall be 16 mm wide by 10 mm deep or 16 mm square.

3.2.4.4 The man-hole lid hinge shall be slotted to allow the use of 16 mm wide by 10 mm deep or 16 mm square sealing rings.

3.2.5 Swing bolts

3.2.5.1 There shall be six swing bolts, equally spaced around the man-hole circumference (see figure 2).

3.2.5.2 Swing bolt hinge pins shall be located on a 285 mm radius circle at their centre (*C* on figure 2).

3.2.5.3 Swing bolt hinge pins shall be 19 mm in diameter (*D* on figure 2).

3.2.5.4 Swing bolt threads (see figure 2, dimension *E*) are not specified in this International Standard. However, to ensure compatibility, it is recommended that the swing bolt thread should be ISO general purpose metric screw thread M20 (see ISO 261[1]).

3.2.6 Slots for swing bolts

Slots for swing bolts shall have a nominal width of 22 mm (*F* on figure 2), with provision to prevent the swing bolt from slipping out of the slot as it is tightened.

3.3 Marking

Man-hole lids shall be permanently marked with their design maximum allowable working pressure and test pressure.

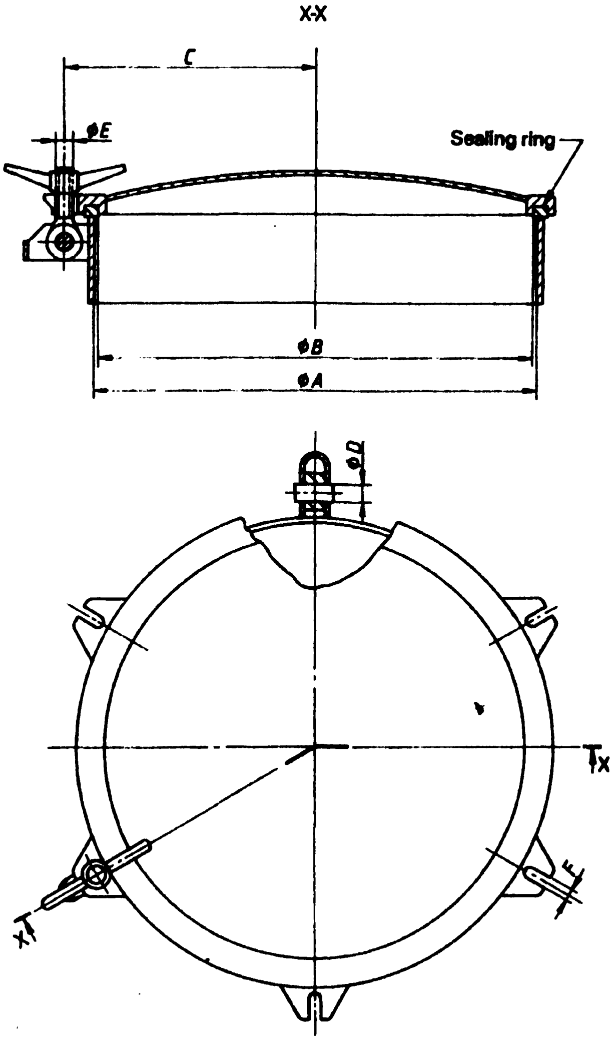


Figure 2 — Man-hole and man-hole lid dimensions

Section 4: Inlet and outlet connection screw threads for tank containers of type codes 70 to 76 and 85 to 88

4.1 General

This section specifies a range of screw threads for threaded interface connections for tank containers complying with ISO 1496-3, of type codes 70 to 76 and 85 to 88, i.e. tank containers for liquids and pressurized dry bulk with a specified test pressure not exceeding 600 kPa.

The threaded interface connections for which the screw threads are applicable are the final connections used to interface with external loading/discharge equipment, external heating and cooling sources, and air and inert gas pressure supplies.

The screw threads specified conform to ISO 228-1[2] and, for the external threads, to tolerance class A.

4.2 Symbols

The following symbols are used in 4.4, figure 3 and table 2.

A	Tighter class of tolerance of external pipe threads where pressure-tight joints are not made on the threads
d	Basic major diameter of the external thread
d_1	$= d - 1{,}280\,654\ P$; basic minor diameter of the external thread
d_2	$= d - 0{,}640\,327\ P$; basic pitch diameter of the external thread
D	$= d$; basic major diameter of the internal thread
D_1	$= D - 1{,}280\,654\ P = d_1$; basic minor diameter of the internal thread
D_2	$= D - 0{,}640\,327\ P = d_2$; basic pitch diameter of the internal thread
G	Pipe thread where pressure-tight joints are not made on the threads
h	Height of the thread profile with rounded crests and roots
H	Height of the triangle of the thread profile
P	Pitch
r	Radius of rounded crests and roots
T	Truncated form of thread
T_d	Tolerance on the major diameter of the external thread
T_{d2}	Tolerance on the pitch diameter of the external thread
T_{D1}	Tolerance on the minor diameter of the internal thread
T_{D2}	Tolerance on the pitch diameter of the internal thread

4.3 Dimensions

The dimensions of the screw threads shall be as given in table 2 and as illustrated in figure 3.

The crests of external threads shall be truncated to the limits of tolerance on the major diameter as given in table 2.

4.4 Designation

For the purposes of this International Standard a simplified designation is used rather than the full designation in accordance with ISO 228-1.

EXAMPLE

For the purposes of this International Standard, the designation

G 1/2 T

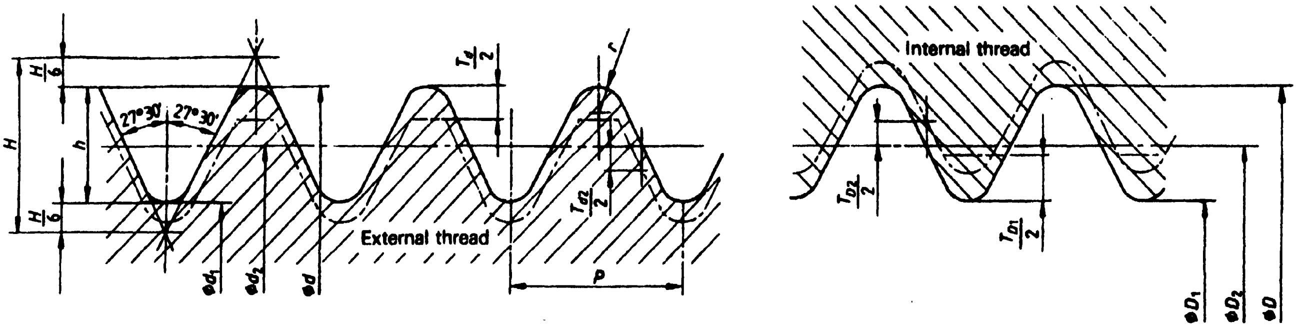
indicates a 1/2 thread in accordance with ISO 228-1, with the external thread truncated.

The full designation in accordance with ISO 228-1 is

Internal thread: **Pipe thread ISO 228-1 - G 1/2**

External thread: **Pipe thread ISO 228-1 - G 1/2 A**

NOTE — ISO 228-1 contains no symbol to indicate a truncated thread.



$H = 0{,}960\,491P$
$h = 0{,}640\,327P$
$r = 0{,}137\,329P$

Figure 3 — Thread profile and tolerance zones

Table 2 — Thread dimensions

Designation of thread	Number of threads in 25,4 mm (1 in)	Pitch P mm (in)	Basic diameters			Permissible tolerances on pitch diameter				Tolerance on the minor diameter		Tolerance on the major diameter	
			Major $d = D$ mm (in)	Pitch $d_2 = D_2$ mm (in)	Minor $d_1 = D_1$ mm (in)	Internal thread T_{D2}		External thread T_{d2}		Internal thread T_{D1}		External thread T_d	
						Lower deviation	Upper deviation mm (in)	Lower deviation mm (in)	Upper deviation	Lower deviation	Upper deviation mm (in)	Lower deviation mm (in)	Upper deviation
G 1/4 T	19	1,337 (0,052 6)	13,157 (0,578)	12,301 (0,484 3)	11,445 (0,450 6)	0	+ 0,125 (0,004 9)	−0,125 (0,004 9)	0	0	+ 0,445 (0,017 5)	−0,25 (0,01)	0
G 3/8 T			16,662 (0,656)	15,806 (0,622 3)	14,95 (0,588 6)								
G 1/2 T	14	1,814 (0,071 4)	20,955 (0,825)	19,793 (0,779 3)	18,631 (0,733 6)	0	+ 0,142 (0,005 6)	− 0,142 (0,005 6)	0	0	+ 0,541 (0,021 3)	− 0,284 (0,011)	0
G 3/4 T			26,441 (1,041)	25,279 (0,995 3)	24,117 (0,949 6)								
G 1 T	11	2,309 (0,909)	33,249 (1,309)	31,77 (1,250 8)	30,291 (1,192 6)	0	+ 0,18 (0,007 1)	− 0,18 (0,007 1)	0	0	+ 0,64 (0,025 2)	− 0,36 (0,014)	0
G 1 1/2 T			47,803 (1,882)	46,324 (1,823 8)	44,845 (1,765 6)								
G 2 T			59,614 (2,347)	58,135 (2,288 8)	56,656 (2,230 6)								
G 2 1/2 T			75,184 (2,96)	73,705 (2,901 8)	72,226 (2,843 6)	0	+ 0,217 (0,008 5)	− 0,217 (0,008 5)	0	0	+ 0,64 (0,025 2)	0,434 (0,017)	0
G 3 T			87,884 (3,46)	86,405 (3,401 8)	84,926 (3,343 6)								
G 4 T			113,03 (4,45)	111,551 (4,391 8)	110,072 (4,333 6)								
G 5 T			138,43 (5,45)	136,951 (5,301 8)	135,472 (5,333 6)								
G 6 T			163,83 (6,45)	162,351 (6,391 8)	160,872 (6,333 6)								

NOTE — Dimensions are given in imperial measurements for information only.

Annex A
(informative)

Bibliography

[1] ISO 261 : 1973, *ISO general purpose metric screw threads — General plan.*

[2] ISO 228-1 : 1982, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

(TED 12)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SERIES 1 FREIGHT CONTAINERS — INTERFACE CONNECTIONS FOR TANK CONTAINERS

Section 1: General

1.1 Scope

This International Standard specifies the characteristics of interface connections for tank containers complying with ISO 1496-3.

Section 1 gives the definitions and the testing and welding requirements for interface connections.

Section 2 gives a range of flange connections for tank containers, type codes 70 to 77 and 85 to 88.

Section 3[1] specifies the dimensions and characteristics of man-hole openings and man-hole lids for tank containers intended to contain liquids or pressurized dry bulk, with a test pressure not exceeding 600 kPa for containers of type codes 70 to 76 and 85 to 88.

Section 4[1] specifies the requirements for the interface connection screw threads.

1.2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1496-3:—[2], *Series 1 freight containers — Specification and testing — Part 3: Tank containers for liquids, gases and pressurized dry bulk.*

1.3 Definitions

For the purposes of this International Standard, the following definitions apply.

1.3.1 tank container: A freight container which includes two basic elements, the tank or tanks and the framework, and complies with the requirements of ISO 1496-3.

1.3.2 gas: A fluid substance having a vapour pressure greater than an absolute pressure of 300 kPa[3] at 50 °C or as otherwise defined by the competent authority (see 1.3.6).

1.3.3 liquid: A fluid substance having a vapour pressure not greater than an absolute pressure of 300 kPa[3] at 50 °C.

1.3.4 dry bulk: Assemblies of separate solid particles normally substantially in contact with one another which are or may be rendered capable of fluid flow.

1.3.5 dangerous goods: Those substances classified as dangerous by the United Nations Committee of experts on the transport of dangerous goods or by the competent authority (see 1.3.6).

1.3.6 competent authority: The authority or authorities designated as such in each country or in each

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1) Will be published later as an amendment to this International Standard.

2) To be published. (Revision of ISO 1496-3:1981)

3) 300 kPa = 3 bar (the bar is currently used as a unit of pressure in relevant international codes, often implemented by national legislation).

specific case by the government concerned for the approval of tank containers.

1.3.7 maximum allowable working pressure: That pressure assigned for operation by either a competent authority or other responsible person to a particular tank, above which that tank is not intended to be operated.

1.3.8 test pressure: The gauge pressure at which the tank is tested.

1.3.9 flange: A connecting means using bolts to interface with a similar connection.

1.3.10 interface: Identifiable area used to adjoin an external area.

1.3.11 connections: Specific points within an interface area used to join to a similar external point.

1.3.12 openings: Access points allowing communication with contents of the tank container.

1.4 Design requirements — General

1.4.1 Testing

All interfaces are considered part of the vessel and shall be subjected to the hydraulic tests prescribed for the tank.

1.4.2 Welding

If interfaces are welded to other structures, the welds and preparation for the welds shall be to a recognized code, which may be the same as that to which the tank has been designed.

Section 2: Flange connections for containers of tank type codes 70 to 77 and 85 to 88

2.1 General

This section specifies a range of flange connections for tank containers complying with ISO 1496-3, of type codes 70 to 77 and 85 to 88, i.e. tank containers for liquids, gases and dry bulk with a maximum allowable working pressure not greater than 1 000 kPa (test pressure 1 500 kPa).

The flange connections specified are the final connections used to interface with the external loading/discharge apparatus.

2.2 Dimensions

The dimensions shall be as shown on figure 1 and as specified in table 1.

2.3 Flange thickness

The minimum thickness of flanges may be based on the following examples:

Material	Ultimate tensile strength	Thickness
Carbon steel	430 N/mm^2	20 mm
Stainless steel	537 N/mm^2	16 mm

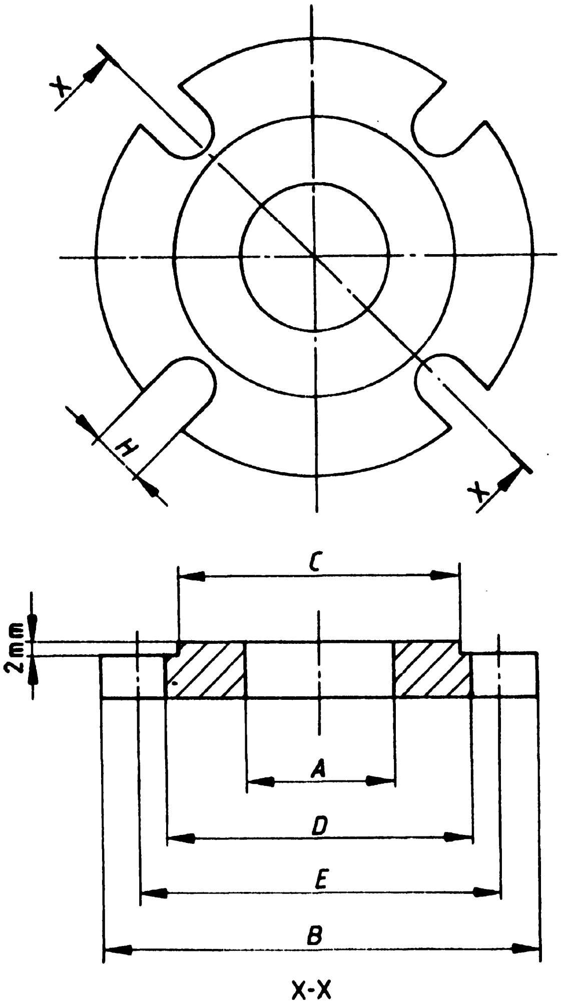

Figure 1 — Flange (see table 1)

Table 1 — Dimensions (see figure 1)

Dimensions in millimetres (inches)

Nominal bore *A*	Outside diameter *B*	Raised face *C*	Core diameter *D*	Pitch circle *E*	Slot size *H*
40 (1 ½)	150	82	82,4	101,4	19
50 (2)	165	101	101	120	19
80 (3)	200	130	131	150	19

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Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 11002

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Regional Offices :	**Telephone**
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Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62
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Printed at Printwell Printers, Aligarh, India